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A **DOT** / FAA FLIGHT STANDARDS SAFETY PUBLICATION

The Slashed Blue Circles — Safer Air With Minimum Control, p. 4

Also in this issue:

Professionalism in Pilots, p. 3 • Dockside Manners, p. 7 • Avionics Burglars, p. 8 • Eyes Right — and Left!, p. 10 • Missed Approach Altitudes, p. 11 • Absent Cues, p. 12 • Flight of the Pterodactyl, p. 13

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Federal Aviation Administration

FAA GENERAL AVIATION NEWS

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BRIEFS

STATIC TORCH. Paper toweling is not recommended for mopping up gasoline spills or removing residue fuel. Such towels can discharge an electrostatic spark when torn or rubbed hard. Rubber sponges or cotton towels are much safer.

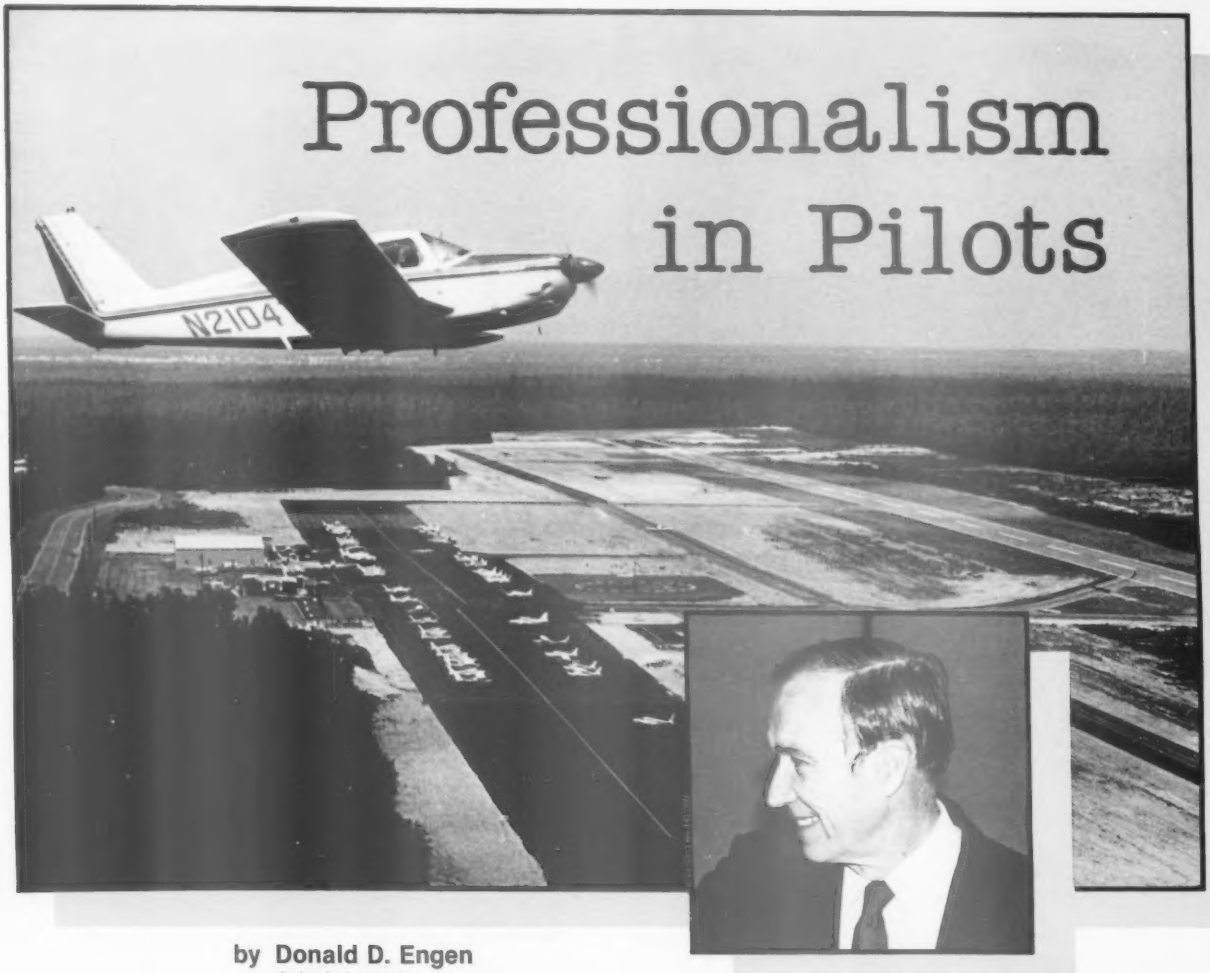
SPAR DECAY. Operators of aircraft with wooden spars or other structural members are advised to have the aircraft inspected periodically for indications of damp, rot, or mildew. The potential lifespan for wooden structures is virtually unlimited, but only if they are fully sealed against contact with moisture--including humid air. Wooden aircraft which winter outdoors, particularly in the southeastern states, are most vulnerable to mildew decay, which can progress unseen unless the interior of the wing is examined by a qualified person.

POT-SMOKING PILOTS, who assume that they are safe as long as they do not indulge in the drug on days when they are flying, are deceiving themselves. A recent simulator study at Stanford University demonstrated that a deficiency in flying skills persists at least 24 hours after "social" indulgence in marijuana, and perhaps much longer. Urine tests for marijuana may be positive 72 hours after usage. Users may be completely unaware of significant residual effects. FAA recommends complete abstinence from all illicit drugs for all pilots.

NATIONAL AWARDS. Now is the time to nominate your favorite flight instructor and/or aircraft mechanic for the 1986 Flight Instructor and Maintenance Technician of the Year Awards. Contact your local Accident Prevention Specialist for details and submit your nominations by June 30, 1986.

CUB HAVEN. Devotees of "rag wing" Pipers will gather July 13 to 19 at Lock Haven, PA, where the first Piper Cub was rolled out of the hangar nearly 50 years ago. The Fly-In will provide seminars on the safe maintenance and operation of fabric-covered aircraft. Contact the "Sentimental Journey to Cub Haven" organization, Box J-3, Lock Haven, PA 17745 (telephone: 717-893-4200).

Professionalism in Pilots



by Donald D. Engen
Administrator
Federal Aviation Administration

Effective accident investigation has been the key to a great deal of aviation progress ever since Orville Wright reassembled the airplane, following the first fatal airplane accident in the United States. The lessons learned from sometimes tough experiences have enabled progress in engineering, aircraft design and development, and operational procedures that improve aviation safety.

As much as we learn from accident investigation, however, our primary emphasis must remain on accident *prevention*. The "Back-to-Basics" program that I initiated at the FAA last year seeks to reinforce the simplest and most straight-forward elements of aviation safety. The most basic element in aviation safety, as in all progress, is a sound and professional approach to the work at hand by pilots at every level.

True professionalism is a product of one's attitude and approach to the tasks at hand. The true professional is never satisfied merely with the performance of satisfactory work. The goal is always to excel. As a test pilot, I was privileged to fly higher, farther, and faster than other pilots had done, enjoy myself while I was in the air, and return to provide vital information for continued improvement. Each time I began preflight procedures, I set high standards for myself, and expected corresponding standards on the part of others working with me. That attitude in pursuit of excellence stays with the entire team from pre-flight through take-off and departure procedures to the landing at the end of the flight.

I have seen that same professionalism in the best pilots around the world. Consistency in this professional conduct can and should be applied to every aircraft, from sailplanes ridge soaring over coastal cliffs to 747's flying from St. Louis to Paris.

When we talk about "human factors" in aviation accident investigations, we are commonly considering the factors that diverted the pilot's attention from immediate professional responsibilities. When our minds wander from these direct responsibilities, we begin to witness the deterioration of that professionalism so vital for aviation safety.

The "Back-to-Basics" program is examining factors that affect flight safety. The program addressed landings in its first months, and is now focused on collision avoidance. As the program moves through other themes, it will help all pilots to remember that professionalism is the key to overcoming all obstacles to safety. We begin with the proper attitude, sustain efforts toward excellence throughout each flight, and strive for the highest possible human performance at all times. That is not only the key to achievement in aviation, it is the mark of the professional in every field. ■

Administrator Engen is a former Navy engineering test pilot and combat pilot in World War II. He was awarded 29 combat decorations, including the Navy Cross for his part in sinking a Japanese aircraft carrier. He served with the National Transportation Safety Board before coming to FAA.

The Slashed Blue Circles

As of May 8, FAA has commissioned 54 Airport Radar Service Areas (ARSA's) in the United States, ushering in a new program for handling dense mixtures of VFR and IFR traffic at moderately busy airports. Much less restrictive than the TCA's and utilizing considerably less airspace than the TRSA's they are replacing, ARSA's hopefully will succeed in reducing the potential for mid-air collisions in busy terminal areas while maintaining free access to major airports for all traffic.

ARSA's are able to do this because they combine the controllability of regulated airspace with a flexible attitude toward the various needs and capabilities of VFR traffic. No particular pilot certification is needed and all types of aircraft have access to the airspace. Parachutists and ultralight operators must obtain prior authorization in order to avoid possible delays. The only operating requirement is that two-way radio communications with air traffic control be established and maintained. Traffic permitting, even this requirement may be waived if suitable non-radio procedural arrangements can be worked out in advance.

The configuration of ARSA's is quite simple: as shown on sectional charts it is the airspace enclosed by two concentric blue circles, extending outward from the primary or central airport for a distance of approximately ten nautical miles.

Some irregularity in the circular design may occur to accommodate underlying small airports or unusual terrain. The ARSA ceiling is approximately 4,000′ AGL. The floor is at the surface within the inner circle and at approximately 1,200 AGL within the outer circle. Note that the precise altitudes for individual ARSA's, as displayed on the sectional charts, is in terms of MSL—i.e., 50/13 printed in the outer circle means that the ARSA ceiling is at 5,000′ MSL and the floor of the outer circle is at 1,300′ MSL.

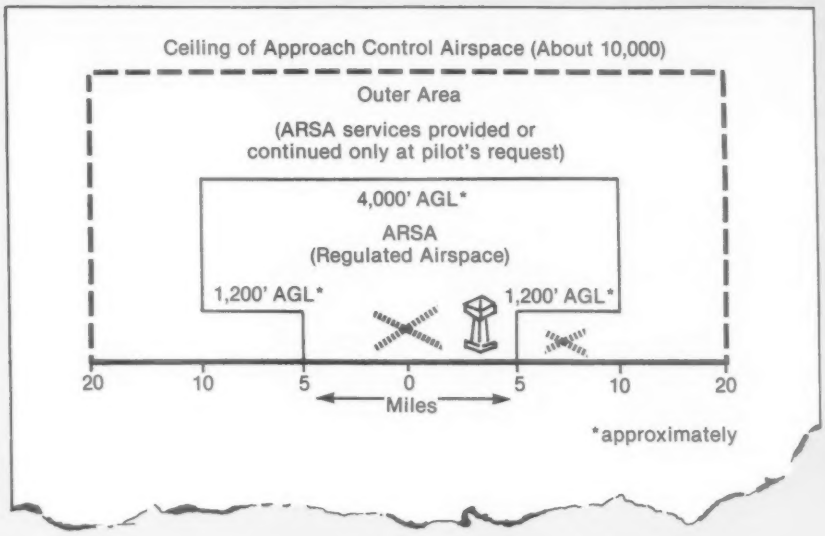
Some pilots regard ARSA's as merely another chunk of "free" airspace that has been swallowed up by regulatory encroachment, resulting in delays, diversions, and controller harassment of VFR pilots. Actually the opposite is true. Radar identification and/or surveillance of all traffic in a busy terminal area reduces the need for ATC vectoring and radio transmissions. A denser, faster flow of traffic is possible, with closer horizontal separation and a greatly reduced likelihood for unresolved conflicts.

Although arriving aircraft must contact approach control before entering an ARSA, no complicated clearance is involved. The aircraft is radar identified and the pilot's intentions are disclosed; if there is no conflicting traffic he or she is able to complete the flight as planned. At the appropriate time, aircraft landing at the primary airport will be sequenced for landing and turned over to local control. Aircraft landing at uncontrolled airports within the ARSA will conform to FAA traffic patterns, in compliance with FAR 91.88 (effective as of March 14, 1985).

Identification is accomplished most easily by squawking a discrete transponder code. Pilots of aircraft which are not transponder equipped can simplify the identification process by calling in when over one of the established checkpoints or reporting points (shown on sectional charts by a magenta flag). The discrete approach control frequency for arriving aircraft at various sectors is shown in a rectangular box. For example, when approaching Winston-Salem-Greensboro ARSA from the west you might call, "Greensboro Approach, Cessna 135 Victor, at 4,500 over Sugar Valley Airport." When more convenient, prominent landmarks or airway fixes may also be used as reporting points.

When transponders or reporting points are not used, the pilot may be directed by ATC to execute one or more identifying turns, for purposes of radar identification.

Additionally, if there is conflicting traffic on entering the ARSA, the pilot may be given whatever vectors are required to enter the flow of traffic in the most direct manner possible. You can speed up the process by listening to the ATIS (automated terminal in-



formation service) before you contact ATC. ATIS will give you current information on weather conditions, traffic, and runways in use. It also helps to listen to the approach control frequency briefly before you key the microphone—not just to avoid interrupting transmissions, but also to clue yourself in on the overall traffic picture.

Keep in mind always that possible conflicts between VFR aircraft are handled by means of traffic *advisories*—not traffic *separation*. Separation means constant vectoring to maintain a given distance between aircraft. Traffic advisories means information such as bearing, altitude and approximate distance to another aircraft with which you may be in conflict. You are expected to locate the conflicting traffic and alter your flightpath as required. (Advise approach control when you do so.)

In emergency circumstances, if a conflict seems imminent, the controller will issue a *safety alert*. This is a recommendation to change course immediately, in order to avoid another aircraft or a ground obstacle. Safety alerts are issued only after pilots have failed to heed, or respond effectively to, previous radar advisories.

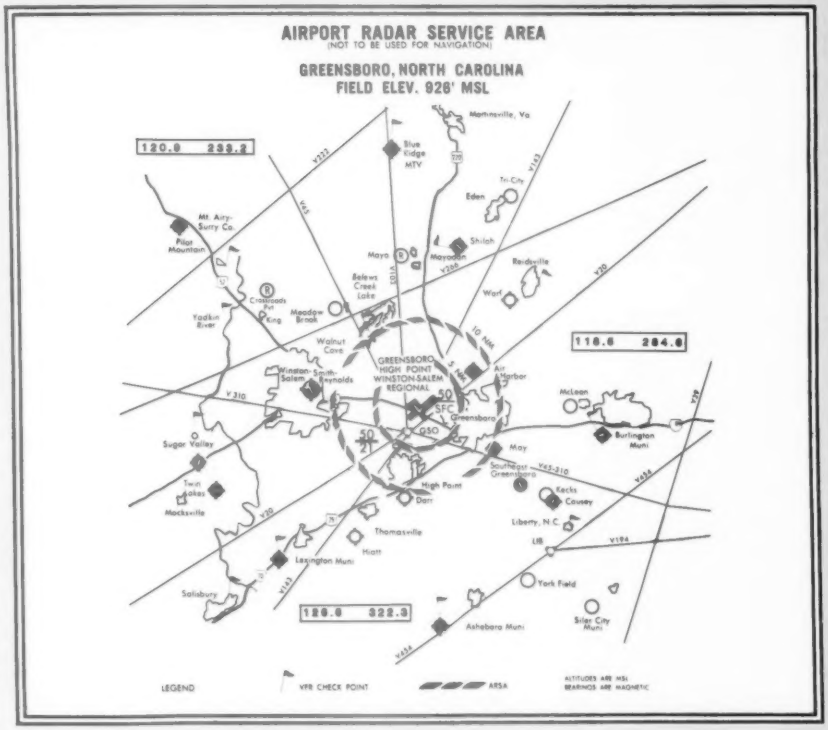
The airspace that extends for about ten nautical miles beyond the ARSA perimeter and rises up to the ceiling of approach control airspace (approximately 10,000 ′ AGL) is known as the Outer Area. This is *not* regulated airspace and it is not shown on any charts. This is the area in which arriving pilots make their initial contact with approach control. Full ARSA radar services will be provided to pilots who contact approach control in this area, unless the pilot declines the service (by requesting to leave the frequency).

Some pilots are reluctant to accept ARSA service until they actually enter the ARSA because they worry about being diverted off course or delayed by vectors. However, the sooner ATC knows *who* you are and *what you want to do*, the sooner they can assist you in reaching your destination. Accepting the service in the Outer Area also means earlier radar protection from traffic conflicts and less chance of your being held up for traffic adjustment at the ARSA perimeter.

Departing from the primary airport in an ARSA is also relatively simple. If the airport has an ATIS, it will give you the information needed by clearance delivery or ground control on initial contact. Usually this will be your type of aircraft, transponder equipped or not, direction of flight, and cruising altitude. You will be assigned a transponder code (if you have a transponder) and a departure frequency. You will be switched to departure control as soon as you are handed off by the local controller.

If you are departing from a satellite airport within the inner circle of the ARSA, obtain the frequency for departure control before you take off and initiate radio contact as soon as possible after you become airborne. If your route of flight will take you close to the primary airport, you are advised to alter your course, as necessary, to avoid this airspace until you have contacted departure control. You should be aware of and comply with departure traffic patterns for your airport, as published in the FAA Airport/Facility Directory.

Remember that ARSA services will not terminate automatically when you leave the perimeter of the regulated airspace. In the Outer Area you have to inform ATC when you wish to "leave the frequency." In busy conditions many pilots prefer to remain under radar surveillance until they are a full 20 miles from the center of the ARSA. Once you leave or change the frequency you will no longer receive traffic advisories or safety alerts.



ARSA SQUAWK LIST

Some of the frequently heard complaints about operating in an ARSA, and what to do about them.

1. **No Entry** *"I called in early and gave them all the dope they wanted to know and then they held me outside the ARSA. What do I need, some kind of magic password? I'd be better off making my call after I'd barged in."*

At any given busy terminal a traffic situation may occasionally develop that results in aircraft being delayed briefly before continuing toward their runway. In this kind of situation, the earlier you announce yourself, the better chance you have of avoiding detours or delays.

2. **Identifying Turns.** *"What really bugs me is having to make a bunch of identifying turns for the sake of radar contact. This is a big waste of time as far as I am concerned. There is nothing in the rule about needing a transponder, or having to make radar contact. Why isn't it enough for me to give them altitude and heading?"*

Radar identification is almost always necessary in order to fit you into a close flow of traffic safely, to issue traffic advisories, and provide separation from IFR aircraft. However, in some situations it may not be necessary. If, for example, you operate an aircraft that does not show up well on radar, the local facility can develop procedures to provide you service even though they cannot see you.

3. **Vectoritis.** *"A lot of times I've been vectored away from my course in an ARSA when I could see no other traffic for miles. Sounds like a bad case of "vectoritis" to me."*

There is usually a good reason for vectoring. For example, it may be that a high performance aircraft were taking off in an opposing direction and climbing out in a nose-high configuration, so that it would be difficult for the pilots to observe you. That would place the whole burden of conflict avoidance on your shoulders, unless you were moved.

Bear in mind that the longer an aircraft remains airborne in the ARSA, the heavier the controller's load. He wants to get you to your destination just as fast as you want to get there—but safely.

4. **Traffic Tantrums.** *"Sometimes it seems to me that I am getting traffic advisories about aircraft that either don't exist or are being pushed up ahead of me on some kind of special priority. I thought the ARSA was supposed to eliminate favoritism in maneuvering."*

ARSA is as new to controllers as it is to pilots, so naturally there has to be a period of adjustment before everyone can work together smoothly. The controllers are transitioning from a mode of providing traffic separation to one of conflict resolution. Pilots are learning how to provide their own separation in a busy terminal area, with the aid of radar advisories. The time required for this adjustment period varies from controller to controller and from pilot to pilot, and allowances must be made during this time. Some vectors or advisories may be issued in an ARSA when they may not be necessary. Some pilots may be slow to initiate action to avoid conflicts at first because they expect vectors. As everyone becomes more familiar and experienced with ARSA's, the bugs should all be worked out. The end result will be better safety and better service. Who could ask for anything more?

In the meantime, if an incident occurs which really troubles you, you should contact the ATC facility manager without delay. If it is done within a matter of days—or hours, better still—everyone involved will have a reasonably clear recollection of what actually happened, and how the problem may be dealt with. It is worth the time and effort, if you care about flying. Two-way, honest, objective feedback is the only way significant improvements to the system can be realized. The agency conducts various kinds of evaluations and quality assurance studies of air traffic programs, but without pilot input on specifics it is hard to know what is really going on.

5. **Out of Place.** *"You say that even student pilots are welcome in an ARSA. Well, I'm not a student but I'm not a high timer either and I get worried sometimes when I get delayed and my fuel needle starts dropping off, or when I can't copy the controller's instructions fast enough. I feel out of place."*

Speak up! The controller may be under some pressure, but if you have fuel problems or difficulty understanding instructions, don't fret about it, let someone know—in plain English: "I'm running low on fuel!" "Speak slower please, I can't follow you!" Out of fairness to the other pilots you should prepare yourself to operate in the ARSA as well as possible, but once you're up there in the blue circles remember what they are put there for. Service! ■

Editor's Note: This article was based in part on material provided by Michael M. Sarli, Manager, Baltimore Air Traffic Control Tower.

ARSA OPERATING RULES AND PILOT/EQUIPMENT REQUIREMENTS

1. **Pilot Certification:** Student Pilot or better.
2. **Equipment:** Two-way radio.
3. **Arrivals and Overflights:** No persons may operate an aircraft in an airport radar service area unless two-way radio communication is established with ATC prior to entering that ARSA and is thereafter maintained.
4. **Departures:**
   a. Primary airport: No person may operate an aircraft within the ARSA unless two-way radio communication is maintained with ATC while within that ARSA.
   b. Satellite airports: Aircraft departing satellite airports/heliports within the ARSA surface area shall establish two-way communication with ATC as soon as possible. Pilots must comply with approved FAA traffic patterns when departing these airports.
5. **Ultralight Vehicles:** No person may operate an ultralight vehicle within an airport radar service area unless that person has prior authorization from the air traffic control facility having jurisdiction over that airspace. (FAR 103)
6. **Parachute Jumps:** No person may make a parachute jump and no pilot in command may allow a parachute jump to be made from that aircraft in or into an airport radar service area without or in violation of the terms of an ATC authorization. (FAR 105)
7. **Hot Air Balloons:** No person may operate a hot air balloon within an airport radar service area unless that person has prior authorization from the air traffic control facility having jurisdiction over that airspace. (FAR 91)

ATC Services

1. **Within the ARSA:**
   a. Sequencing of all aircraft arriving at the primary/ARSA airport.
   b. Standard IFR separation between IFR aircraft.
   c. Between IFR and VFR aircraft—traffic advisories and conflict resolution so that radar targets do not touch, or have less than 500 feet vertical separation.
   d. Between VFR aircraft—traffic advisories and, as appropriate, safety alerts.
2. **Within the Outer Area:**
   a. The same services are provided for aircraft operating within the outer area, as within the ARSA, *when two-way communications and radar contact (when necessary) are established.*
   b. While pilot participation in this area is strongly encouraged, it is not a VFR requirement.

DOCKSIDE MANNERS

Tying Down A Float Plane In Fair And Foul Weather

You have just about completed a nearly perfect afternoon flight in your float-equipped airplane, with two business friends on board who were enjoying their first experience in flying over water. You cut the engine and step jauntily out on the float, bow line in hand, ready to make fast to the piling at the dock as the airplane's momentum carries you shoreward. But to your surprise a sudden offshore gust starts pushing you away from the dock. What to do? Take a flying leap toward the dock, and risk the humiliation of a public dousing? Unship the paddle and try to out-muscle the wind. Slip back in the cockpit and hope you can get a quick restart before you drift against a mooring?

There are times, at the conclusion of a flight, when handling a floatplane calls for a good bit of seamanship. A waterborne airplane behaves pretty much like a boat and is subject to many of the same natural phenomena that affect any other waterborne vessel. The time to practice your seamanship skills is in calm weather, in the company of experienced companions.

Moving out from a dock or mooring does not present as many problems as returning, since you are usually not about to undertake a flight in a floatplane if the wind is strong or the water choppy, except for compelling reasons. But adverse weather conditions can spring up around your water airport while you are out flying, or be waiting for you at your destination in some remote wilderness area.

The first important decision you have to make, as you taxi toward your intended dock or mooring, is *when* to cut the engine. You don't want to dent the floats, but you don't want to swim for shore with a rope in your teeth either. Experienced seaplane pilots scan the water carefully for signs of adverse current or wind, and try to switch off at a point that allows the floats to just gently "kiss" the (hopefully padded) dock. While many pilots stop the engine with the ignition switch rather than with the mixture control, in order to make a quick restart possible, if needed, FAA does not recommend this procedure, due to the possibility of engine backfire or other damage upon restart. Following the manufacturer's recommendations is the safest policy. Selecting the appropriate engine cutoff point can be demanding if there is any appreciable wind, especially from the tail or from the side or a strong current. A deceptively smooth surface can mask a rapidly moving body of water, in a stream or tidal basin.

If something goes awry and your forward motion stops short of your intended tie-up, a paddle may help. Most seaplanes are equipped with a paddle. However, not all seaplane pilots realize the limitations of this tool. For an aircraft, a paddle is strictly a *calm weather, still-water implement.* A seaplane pilot has trouble making headway with a paddle against any wind of five knots or more, or any current or tidal flow of similar velocity.

Furthermore, directional control may be just about hopeless. Even in the quietest of conditions it is difficult, since you will be paddling from well to one side of the aircraft. A waterborne vessel weighing in the neighborhood of 2,500 to 3,000 lbs. is no canoe—it is just not easy to push around with a paddle. And with most of the structure well above the waterline, the effect of wind pressure, as compared with paddle pressure, may prove to be too much to handle.

A supplementary tool that could extend your reach shoreward by at least half a dozen feet would be a boathook. There are some very lightweight aluminum models available now that telescope into a short length that is easily stowable inside the airplane. A fixed length boathook could be clamped to the float struts with an appropriate easy-release fastening.

If you do a lot of close maneuvering in shallow water, in the presence of sandbars, boulders or reefs, your best tool might be a sized down version of the time-honored barge pole. You can put almost your whole body weight on a pole and use it to push your airplane in any direction. It is also useful for prying jammed floats off underwater obstructions, and for testing the depth of the water immediately ahead.

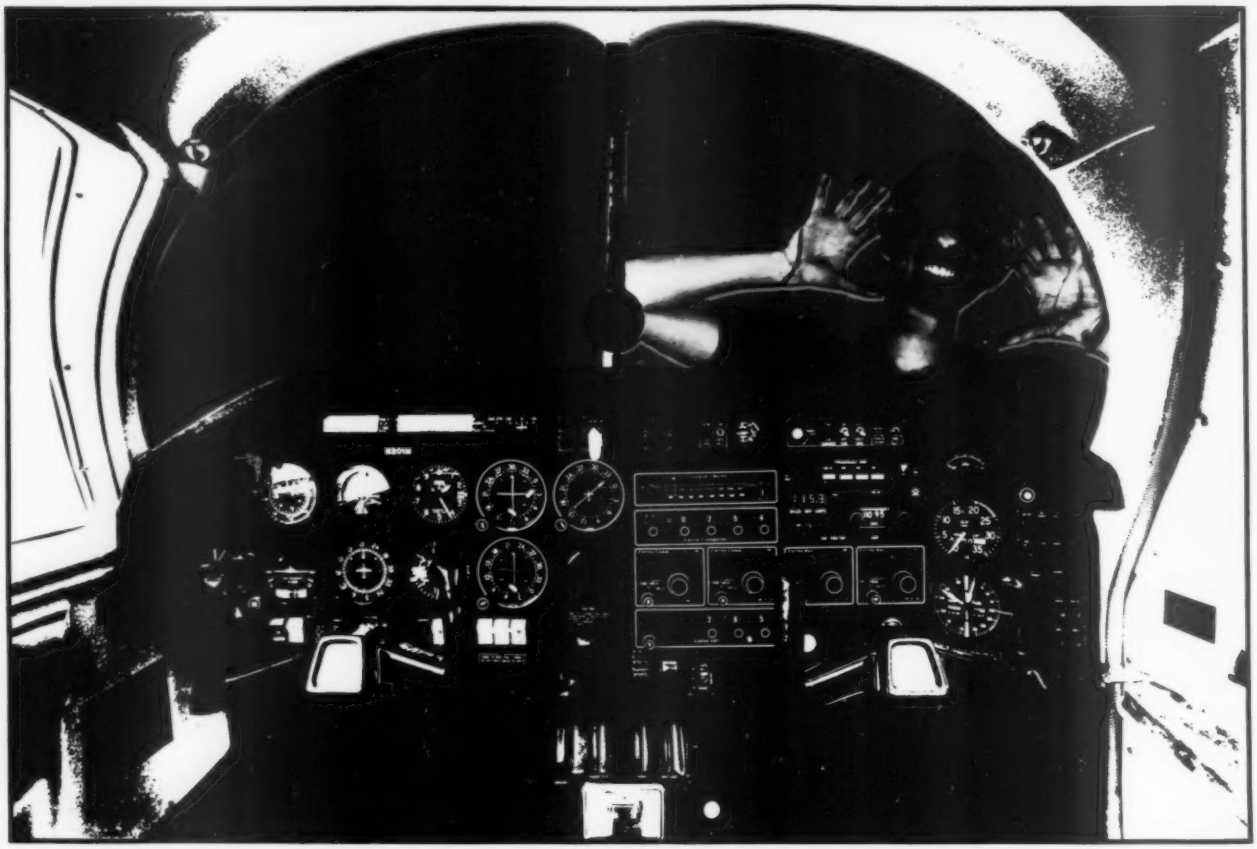
To avoid getting the pole jammed into rock crevices or stuck in a muddy bottom you might want to have a metal plate fitted to one end. Like the boathook, the pole also can be made of lightweight aluminum and may telescope or fold to a stowable length. In an emergency, poles may be cut from saplings or bamboo clumps on the shore.

If you intend to carry such tools outside the fuselage, you will need FAA-approved devices to secure them. See your nearest Flight Standards District Office for guidance and approval. Proper stowage of equipment inside the aircraft is also important, as regards to both aircraft trim and passenger safety.

Some floatplane pilots like to carry an anchor as well. Not a heavy mass of lead but a grappling device of modest weight. Very useful when tie-down space is not available.

Last but certainly not least in the way of mooring equipment is a goodly quantity of rope, or "line," if you want to be salty about it. The wider your range of travel, the more rope you should carry—300 to 400 feet is not unusual for Alaskan bush flying. With enough rope on board you can operate independently of docks, mooring buoys or other trappings of civilization. In any case, extra rope gives you the option of rigging mooring lines in a manner best calculated to enable you to ride out a storm without float damage. Learn (or relearn) some knot tying techniques from seasoned boaters and you will soon be a fully prepared aeronautical person. ■

Editor's note: This article was based on information provided by Operations Inspector John Roseborough. Additional input from an article written by C. Marin Faure for "Water Flying" magazine, used with permission of the Editor, Mary Silitch.



THEY DON'T ALL GET AWAY WITH IT

Avionics are the prime target of aviation burglary rings

This is the city, San Jose, CA, Tuesday, September 17, 1985. I was working the sales desk at my company, Gordon Avionics. My partner, Russ, had gone home for the day. My name's Jerry. I'm not a cop.

5:15 p.m. The phone rings. A confident voice on the other end asks if I would be interested in purchasing some used avionics. His story is that he has a friend with a TV shop through which he was able to acquire a King Radio KNS-80 and a KT-76A. He hoped to make a little profit in so doing.

I told him I would certainly be interested, but it would have to be proven that the radios were not stolen. He then asked me how I could find that out. I told him of the International Aviation Theft Bureau and their listings. I offered to check the serial numbers right then if he wanted. He gave me the serial numbers, which turned out to be not on the list, so we began to bargain. He told me of another offer from a competitor of mine, so I matched it. He said he wanted cash. When I asked "why?" he had a very logical answer: After all, who would want to go into a bank and try to cash a 4 figure check. He didn't want the hassle.

I could understand that, but when I asked his last name he declined. He wanted the phone number of the Theft Bureau so he could check the numbers himself. Didn't know me and didn't want to get involved if it turned out the radios really were stolen. Said he was a pilot and wouldn't want to jeopardize his certificate. He would call the Theft Bureau in the morning and if the radios were OK he would call me and set up the purchase. Said he would give me a bill of sale and furnish identification at that time. Sounded somewhat reasonable, so I said OK.

Something bothered me about the whole thing as I went home and relaxed for the evening. It continued to bother me while I was trying to sleep. What if this was the old double switch-a-roo? For those of you who have not heard of this, it's simply a matter of stealing a radio from one aircraft and replacing it with a like model from a second aircraft. The owner of the second aircraft reports the serial numbers of his missing radio, but it's never found because it sets in the first aircraft. The owner of this aircraft has nothing to report since apparently he still has his radio.

Well, with the serial numbers I'd got, I thought maybe I could track this whole thing down. If I could find the registered owners and contact them, they could check the serial numbers of the equipment in their aircraft and see if they matched King Radio's records. They could tell me they had bought new radios, or the aircraft were scrapped or something, to explain why these two radios were floating about. Sounded like the thing to do, so I went to sleep.

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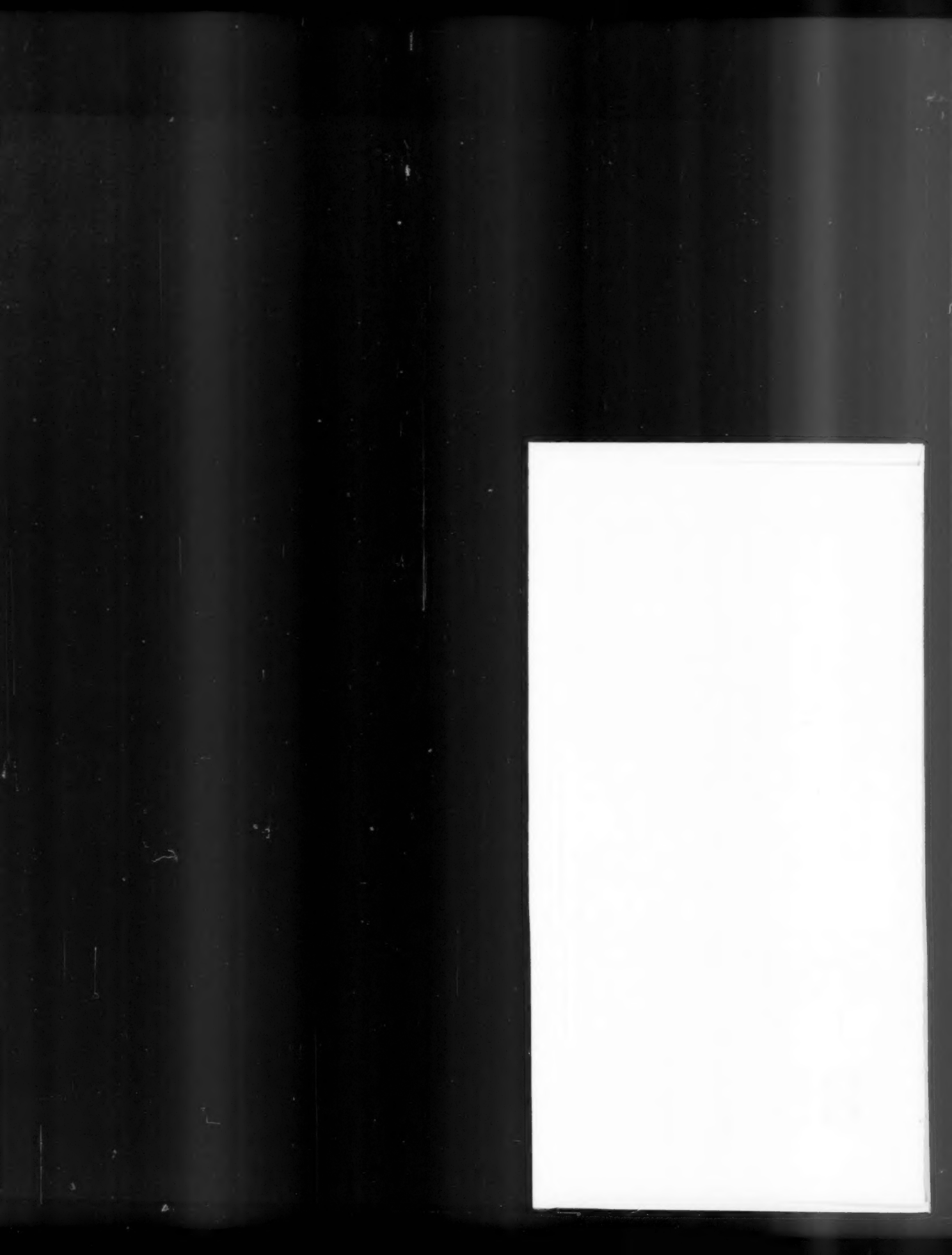


Wednesday, September 18, 7:30 a.m. I called King Radio and asked for the warranty department. Told them of my suspicions and what I planned to do. They came up not only with the owner of the radios (both registered to the same aircraft), but also a phone number from the warranty application. Were eager to help and wished me good luck.

7:50 a.m. I tried calling the number. No answer. Either the owner had left for work or he was still sleeping.

8:00 a.m. My son Russ and the whole crew files in. Another day starts in the avionics world. A day of a lot of nervous waiting. After the job assignments and everyone is involved in their tasks, I fill Russ in on the radio gambit and ask him to take over and follow up with what he had.

8:10 a.m. Russ calls the number again that was furnished by King Radio. A man answers. Fixed Base Operation, location in northern California. Aircraft in question is on leaseback to them. FBO gives Russ work phone number of the owner.

8:15 a.m. Russ contacts the owner who is all ears. Owner confirms he has a KNS-80 and KY-76A installed in his aircraft. Following explanation of the double you-know-what the owner agrees to have the FBO immediately check the serial numbers of the radios and get back to Russ. Owner volunteers that a couple of years ago he had those same radios stolen and they had been replaced by the insurance company.

8:30 a.m. The Voice calls about the two radios for sale and is given to Russ. Voice starts talking about taking cash and perhaps a hand-held transceiver as payment for these radios. Says he has called the Aviation Theft Bureau and found that these numbers are not on their list. Ready to deal now. Russ stalls Voice with chatter about the benefits of one hand-held transceiver over another. Tension mounts. The Voice says he will call back at 1:00 p.m. and tell us when he can bring the radios over for the sale.

9:30 a.m. The (rightful) owner calls and asks if we have heard from the FBO yet. We have not. He says he will call them again.

10:00 a.m. The FBO calls. Guess what? No radios!

Russ calls the San Jose Police Department and explains the situation. Sergeant says to have FBO in northern California contact local Police Department with a complaint and have them in turn get in touch with him. Russ makes the necessary calls.

12:30 p.m. No word. Russ won't go to lunch. He might miss something.

1:00 p.m. The phone rings. It's the Voice. He will be here in an hour. Russ is Mister Cool says he will have the cash waiting when seller gets here.

1:02 p.m. Russ calls the San Jose Police sergeant and asks if he has heard from the PD from up North. He has. Russ said the suspect will be here in an hour. Sergeant said his men would be there in half an hour.

1:30 p.m. No one here yet.

1:45 p.m. Three undercover guys with shirts hanging outside their belts came to our shop. "OK troops," I tell my guys, "here's the scenario." Undercover number 1 is out at our intersection with his old car, hood up, apparently in some kind of difficulty. He has his little portable and talks to the other two in the shop, alerting them of approaching cars or people. "Ford pick-up parking in front, man getting out, pausing, looking around, nope, going into gift shop." "Man approaching on foot, red baseball cap, no, went on by." And so on.

My poor daughter, Pam, our secretary, sits by the door where suspect will enter. She is staring out the window, wondering if she will be caught in the line of fire, taken hostage, or what. Not too much work done by her that day. Russ is staring out of the window with Pam, wondering how big this Voice guy is. I am in my office with the two undercover guys making light conversation and listening to my pulse as it increases. May have set a new record.

3:00 p.m. The man doesn't show. Customers come in and out and are dealt with quickly. They are led to the shop area to talk and don't appear to suspect anything.

3:30 p.m. A white van pulls up out front. The man looks at our shop. He gets out. Scruffy looking. Looks around. Pam comes to office and makes sure undercover guys know there's a van out there. Scruffy man opens door of van. Removes box. Pam comes back in and lets undercovers know he is getting out a box. He approaches and enters. Man asks if this is Gordon Avionics. Pam nods, unable to speak. Man says, "I have a delivery from Radio Shack, sign here." Everybody relaxes.

3:40 p.m. Undercovers are told to stop stakeout at 4:00 p.m. I almost faint. "What happens if this guy comes and you aren't here? Please stay until we close at 5." They make a call downtown and get an OK. I breathe again.

5:00 p.m. Oh well, nice try. Let's close up and go home. Maybe next time. He must have gotten cold feet. My crew leaves. Russ gets in his car, I in mine. The three undercovers are standing outside my door talking. I start my engine. Judy from the gift shop next door comes running out shouting, "Wait, you have a customer!"

A man with a red baseball cap strolls up to the three undercovers and asks one of them if he is Russ. It appears that he had been in the gift shop for some time, either getting up enough nerve or deciding whether or not to go through with the deal.

Undercovers tuck their shirts in, exposing badges, guns and cuffs. Man becomes rather ashen. "San Jose Police, like to ask you a few questions." Just like on T.V.—the good guys win! *Sometimes.* Made us feel good, anyway. ■

Aircraft burglaries are still on the increase, with 270 break-in thefts reported in 1985, compared with 267 the previous year. Avionics are a prime target for this kind of thievery, which appears to be the work of well-organized rings using sophisticated tricks, like the double steal described in the accompanying article. In some cases only key components of the radios are taken, with no sign of disturbance, so that pilots who are not in the habit of checking out their radios carefully on the ground before a flight are in danger of finding themselves without important navigation or communications equipment when in need. *Don't get caught short!*

Stolen equipment should not only be reported to the local police—but also to the International Aviation Theft Bureau, an organization sponsored jointly by AOPA Air Safety Foundation and major aircraft insurance companies. In reporting thefts, provide the serial numbers of the missing equipment, as well as make and model information. The Bureau is located at 421 Aviation Way, Frederick, MD 21701; tel. 301 695-2022. The executive director, Robert Collins, will assist you in seeking to recover your property.

Editor's note: The above was adapted from an article by Jerry Gordon and reprinted with permission from AVIONICS NEWS, a monthly publication of the Aircraft Electronics Association.

Eyes Right and Left!

The most sophisticated equipment made, alone, cannot prevent pilots from being involved in a mid-air collision without assistance and effort from the pilots themselves. It is through the use of our eyes to see and be seen and see and avoid that we can give ourselves the best chance of not being involved in a mid-air collision. It has been estimated that 80% of our total information intake is through the eyes. Therefore, while in flight, the use of our eyes to help perform the many tasks involved in piloting an aircraft must include one most important function—to be the primary anti-collision device on board the aircraft.

Studies of previous mid-air collisions show a clear pattern of when, where, and who are involved. We average approximately 24 mid-air collisions per year in the United States resulting in loss of equipment, damage and destruction of both private and public property on the ground, and most important, the loss of human life both in the aircraft and on the ground. These all are losses that can be stopped. Although a mid-air collision can occur at any time, there is a collision season that runs from April through October. Two of the most intriguing facts about mid-airs are that they occur during daylight hours and in clear weather. This could be the time most pilots feel that they are *least* likely to be involved in a mid-air and allow themselves to become complacent. Don't let this happen to you!

Approximately 70% of all mid-air collisions occur below 3,000 feet above the ground and within five miles of an airport. We know this is normally where our highest concentration of air traffic is located; however, there are *four times* as many mid-air collisions below 1,000 feet than between 2,000 and 3,000. When we examine mid-air collisions in the traffic pattern, we see that two percent occur on the downwind leg of flight, 18% occur on the base leg, and an overwhelming majority, 80%, happen on the final approach to landing. Of the 70% of mid-air collisions which occur within five miles of an airport, about two thirds are at uncontrolled airports. These statistics clearly reveal where the potential for a mid-air collision is greatest.

Pilot experience seems a significant factor in mid-air collisions. While no pilot is immune from the possibility of a mid-air, approximately one half of all mid-air collisions involve pilots with less than 1,000 hours of flying experience. Pilots who have not mastered, or do not *practice* good scanning techniques and become easily distracted, are prime-candidates for a mid-air collision. When more experienced pilots transition to a different type of aircraft, they increase their potential of being involved in a collision, because of the higher likelihood of distractions.

There is an abundance of evidence that highlights our need to continue to work to reduce mid-air collisions both as individuals and as organizations. Among the techniques that we can utilize are foolproof scanning techniques. This is especially true around airports where traffic density is high and pilots find themselves preoccupied with other duties associated with takeoff and landing. When given a chance, avoid crowded airspace during enroute and instrument training, such as directly over a VOR or other navigational aids. Strobelights or rotating beacons should be used at all times, unless special situations dictate otherwise.

Studies show that high intensity strobe lights increase an aircraft's contrast by as much as ten times, both day and night. Use the aircraft transponder and Mode "C" capability at all times. Remember, it is required when operating in controlled airspace. Discover where the blind spots are located for the particular aircraft you are flying and make allowances for this in your scan pattern and technique. Use your aircraft radio to broadcast your position and intention at least 15 miles out from the airport. Use your eyes, as well as those of any passengers you may have on board, to look for other aircraft.

And finally, plan ahead and keep the cockpit neat and uncluttered. The less time you spend with your head down in the charts, the more time you have to scan for other aircraft.

Being aware is one of the key factors that can contribute to the prevention of mid-air collisions. Collision avoidance must remain foremost in the minds of all pilots and everyone who is part of the aviation community. FAA's Accident Prevention Program is promoting and encouraging collision avoidance awareness as a second phase in the "Back-to-Basics" program. Although the mid-air prevention campaign runs only April through June, this should be a priority for all of us throughout the year. We in FAA and in the Accident Prevention Program need and ask for your support and participation as members of the aviation community.

There is no regulation or rule that can replace the principle of "see and be seen and see and avoid" when flying. Let's use our eyes and encourage everyone else to do the same. It's the best anti-collision device we have. ■

INSTRUMENT CORNER:

Missed Approach Altitudes

During a recent visit to the Houston Center I was told by a controller that during the difficult weather associated with hurricane "Juan" he observed several pilots in his sector climb considerably above the published missed approach procedure altitude, while executing the missed approach. The controller said the published missed approach altitude was a mandatory altitude and he was concerned about possible conflicts with traffic in hold at higher altitudes at the same fix.

During my instrument training I was taught that upon reaching a decision to miss the approach I should first establish a positive rate of climb, then clean up the aircraft, fly the missed approach and communicate with air traffic. I don't remember anything being said about not flying above the published altitude.

For example, on the current approach plate (U.S. South Central) for the Minden NDB approach to Runway 1, the missed approach procedure calls for a "Climbing right turn to 2,000 in MNE NDB holding pattern." According to the legend page, 2,000 shown in this manner, with no line above or below, would be a "recommended altitude," not a maximum altitude. Please note also that the same 2,000 is depicted as a "minimum altitude" on the approach profile and as a MSA on the approach plan! Hence the confusion.

In training, much emphasis is placed on mandatory, minimum and maximum altitudes, but relatively little is said about missed approach altitudes, other than what is stated on the chart. My personal interpretation of 2,000′ as a missed approach altitude would be to "get up to at least this high as promptly as possible." I have posed this question to several pilot friends, and they all agreed that under these circumstances they would probably consider an expeditious climb more important than precisely hitting and holding the missed approach altitude, particularly in the absence of a definite designation of that altitude as maximum, minimum or mandatory. But consider the following hypothetical situation:

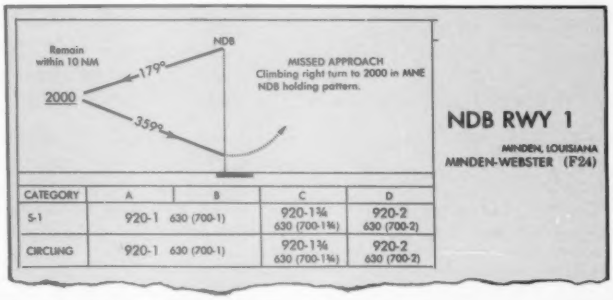
The pilot of a high performance airplane commences an actual missed approach at Minden (NDB R-1) from a minimum descent altitude of 920 feet. In his anxiety to out-climb any possible obstructions, to turn on course, clean up the airplane, communicate, and then consider his next options, the pilot very easily outclimbs 2,000′ in less than one minute, perhaps without noticing it, and keeps on climbing. If he has no Mode C encoder and doesn't report his altitudes promptly, ATC may not even realize that there is a possible conflict in the holding area. They could be holding traffic at 3,000′ at this fix.

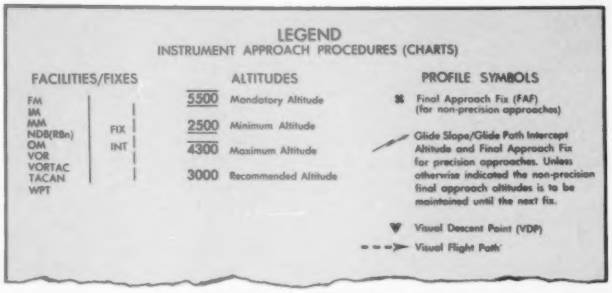
What say you?

Dale P. Jewett
Hutchinson, KA

The altitude given for a missed approach is a *clearance* altitude. As such it is not a recommended, minimum, or maximum altitude, but a *mandatory* altitude which the pilot is to achieve promptly and maintain until otherwise notified by ATC.

On Government charts the basic instructions for executing a missed approach are given *textually*, not graphically. It is true that these instructions are located in the same box which contains the graphic profile of the approach, but the graphic symbology for the profile depiction does not apply to the missed approach text. Likewise, the symbols shown on the profile legend page, to indicate whether an altitude is *recommended, maximum, minimum,* etc., apply only to the profile *picture*, not the missed approach instructions, which happen to be printed nearby. The missed approach altitude is always an *assigned* altitude.





The approach chart for Minden indicates you are to make a climbing right turn, enter the holding pattern at 2,000′, and remain there until otherwise advised. If you do not have an altitude encoding transponder you should inform the controlling facility as soon as you are established at the altitude and in the pattern. As you suggest, other traffic may be holding in the pattern at the next 1,000 foot level.

Editor's note: In response to reader requests we will be expanding the Instrument Corner (normally included in the FORUM page) to a full page article, space permitting and when justified by the subject matter.

Expect the *UNEXPECTED*

"Expect the unexpected!" is the motto of John H. Doster, Manager of the Allentown (PA) District Office who has over 40 years of experience as an inspector. This is the second article of a series of his flying reminiscences.

Aviation safety messages can be hidden by the buzz words and phrases in vogue today. "Management of cockpit resources" frequently appears but it seems to me that these words are more appropriate to the business world than to the cockpit of an airplane, be it large or small. We call the pilot in command "Captain" and expect him to act in that capacity, not as a chairman of a committee. A sea captain, at 30 knots in rough seas, may have time to discuss alternatives with his crew; however, a committee meeting at 300 knots or more is a luxury not available to the pilot in command of an airplane. Instead, he must use the knowledge, skill, and ability he has gained from training, experience, and exposure to the problems encountered in flight. Calling this "management" seems to remove some of the authority, responsibility, and accountability denoted by the word "command." The crew, as a whole, is a team dedicated to the safety of a flight. By returning to this concept, we may regain something lost.

The success of a flight is still the art of putting that knowledge, skill, experience, and exposure together to make the airplane perform as you command. There are those who make each flight a milestone in developing skills and perception, and can proudly call themselves pilots. There are others with the label, but often it is unearned.

The simplicity of early airplanes made the fundamentals easier to identify and, therefore, more easily learned. *Straight and level* flight could be seen, felt and heard. Any increase or decrease of airspeed was immediately identified by the change in the sound of the wind and the engine. In a *climb*, when the "wind song" softened and the engine labored, you most certainly knew you were climbing. A *glide* was signaled by a change in the musical pitch of the wind through the flying and landing wires and by a change in the engine tempo. In a *turn*, misuse of the rudder was followed by a blast of wind on the side of the face; from the high side of the bank it signaled a skid, from the inside of the turn you knew you were slipping. As you learned these things they made an indelible impression on your mind.

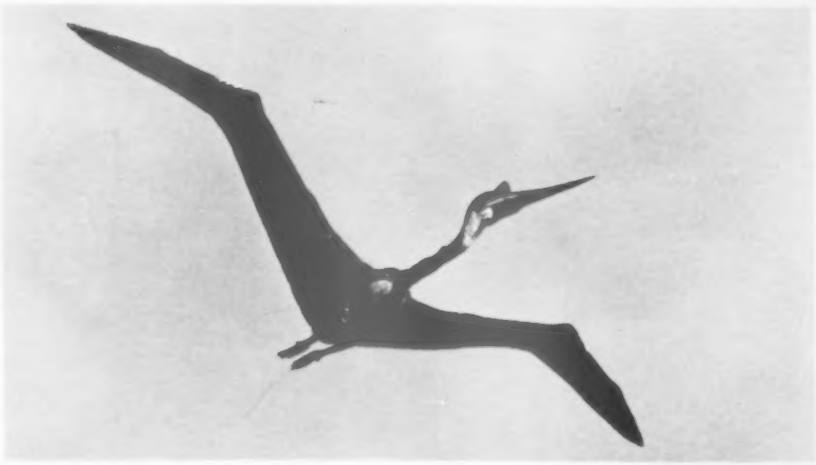
In the comfort of today's closed cockpit you find instruments capable of signaling how well you perform those same basic fundamentals. It is interesting to note that we can program an autopilot to perform these fundamentals correctly. It would be nice if we could program our pilots as easily. Learning to understand these most fascinating devices can steer you to the ends of the earth and bring you to the end of a runway of an airport you have never seen. They can sort out the storms ahead, measure the wind, even fly the airplane with great skill. We can fly faster than the speed of sound and keep up with the sun. The understanding of these things does not come from the clear blue sky to settle in a pilot's mind. No, it has to be put there by constant study and practice, and it is hard work. In aviation, proficiency training is continuous.

Even with all these wonders, disciplined training in accordance with the rules is still necessary. Here is an example.

In a recent *Jetstar* flight test the weather was at minimum but a good alternate was nearby. On the ILS to landing we passed the outer marker with the gear and flaps down; we weighed slightly over 35,000 lbs. The bug speed for approach was 157 knots and for landing 1.3Vs was 139 knots. On the glide slope this gave about 12 + feet per second sink and forward velocity of maybe 230 feet per second. There was a slight surface wind from the left. Decision height was 200 feet. At 200 feet we were aligned with the runway, but were about one degree off heading to the left. The pilot raised his eyes, saw the slight problem and, rolled in right aileron but failed to use right rudder. The nose yawed a bit more to the left before starting to come around to the right, but time ran out and the corrections came too late. We were unable to land. We missed the following two approaches for the same reason! While holding at the marker for a single turn, we talked about adverse yaw and coordination of aileron and rudder, and from the next approach we landed. Initially, had he applied aileron and rudder properly, the nose would have aligned with the centerline of the runway in time to accomplish the landing.

As you can see, the Wright brothers had the basics pretty well pegged. Preventing yaw was one of the secrets of their success. ■

Flight of the Pterodactyl



QN—The Time Traveler™

"Everyone has daydreamed about being a time traveler, able to observe at first hand events of long ago. We cannot physically go back in time, but we can create mental images of the past and make the images stronger through books and art and moving reconstructions with film or replicas."

This statement was made by Dr. Paul MacCready, a California engineer widely acclaimed for creating seemingly impossible flying machines—such as the first man-powered aircraft. He is now at work on a flying replica of one of the largest creatures ever endowed with the ability to fly—the QN.

In 1972, the fragmented fossil remains of a pterodactyl, or pterosaur (flying lizard), were found at Big Bend National Park in west Texas—estimated age, 65 million years. When reconstructed, the creature was an amazing 40% larger than all but one other flying creature, living or dead, with a 36 foot wing span. The genus name *Quetzalcoatlus*, after the legendary Aztec serpent god, was given to this huge winged reptile. The species name, *northropi* refers to the tail-less pioneering aircraft known as the Northrop "flying wing." Hence, *Quetzalcoatlus northropi*, or *QN* for short.

Soon after the discovery Dr. MacCready began collecting information on the *QN*, knowing that technology would advance enough one day to make a flying replica possible. As an aeronautical engineer specializing in fluid mechanics, environmental science, and wind energy, MacCready was well aware of the complexities he would have to deal with in constructing this replica. However, by late 1983 he felt that space age technology had advanced sufficiently to make *QN* a possibility. With the encouragement and support of the Smithsonian National Air and Space Museum, Project *QN—The Time Traveler*™ was born.

In the summer of 1984 a team of aerodynamicists, engineers, paleontologists, natural historians, and biologists met with MacCready in southern California. They compiled all known data, which was admittedly sparse, on the *Quetzalcoatlus northropi* and started to formulate a design.

The team theorized that the original *QN* was most likely a glider, who could walk rapidly enough to take off from flat ground or a bluff, climb weakly, and utilize updrafts or thermals for sustained soaring. *QN*'s size and weight would put any other flight capabilities on the extreme edge of improbability.

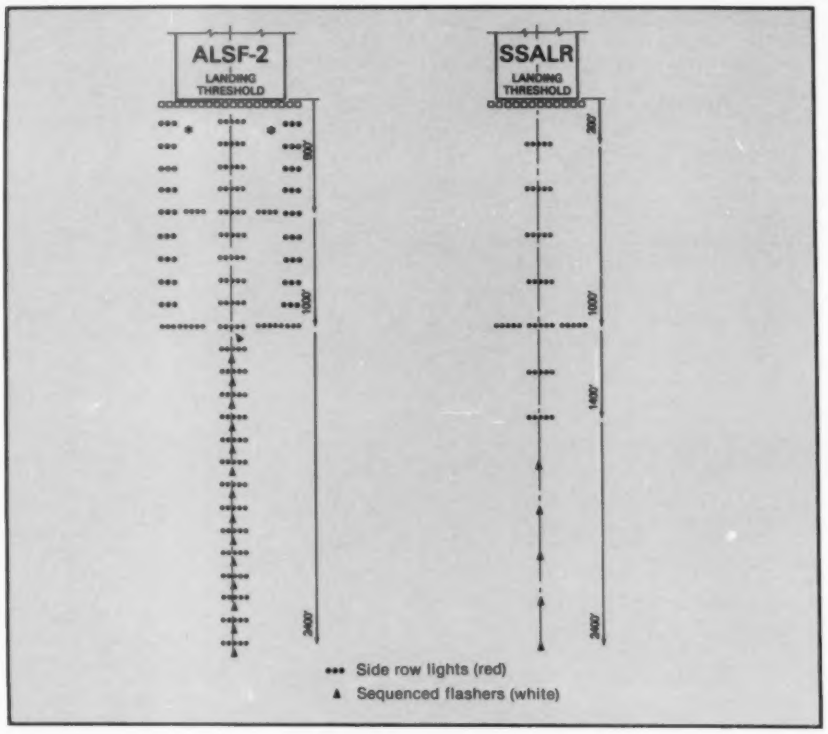
Test models were built of composite materials, beginning with gliders, then moving to wing flappers with radio-controlled wings, ranging in size from 1.0 to 5.5 meters. Each model was designed to test a particular problem before going to the next step. There were three major technical challenges to be overcome—obtaining stability/control around all three axis for gliding; launching the replica into flight; and adding propulsion via wing flapping, sufficient for a gentle climb.

Meanwhile back in Texas, paleontologist Wann Langston had assembled a fiberglass skeleton cast from the *Quetzalcoatlus* bones. This was hung from adjustable slats and the bones were manipulated to find all possible joint movements. Langston discovered that the neck had very little mobility from left to right, but the ball and socket joint at the head and neck would allow rudder-like head movements for stability and control despite the absence of a tail.

Experts theorized that a pterodactyl like *QN* ran on bird-like legs to launch itself into flight. For the replica to take off realistically, leg mechanisms would have to be developed that simulated this running motion—a herculean task for the team. As airborne movement rather than takeoff thrust, was the project's chief interest, the group decided to concentrate on getting the QN to fly, and simply winch the creature into the air like a glider. A wheeled trolley attached to a 4,000′ long winch cable stretched across a field and wound on motor-driven drum served the purpose.

(continued on page 16)

Dr. Paul MacCready,



ALTERNATE APPROACH LIGHTS

Pilots who land at major airports equipped with ALSF-2 lights (high intensity approach lighting system with sequenced flashing lights) should be prepared to see the more subdued SSALR (simplified short approach lighting with runway alignment lights). In the interest of conserving energy, FAA has installed the dual mode ALSF-2/SSALR system at many airports with Category II runways. In conditions of relatively good visibility, the control tower will switch over from the power-hungry ALSF-2 to the simplified SSALR.

When this happens the 18 red side row bars disappear, and the 24 steady-burning white centerline bars are reduced to seven. Also, instead of 15 sequencial flashing lights there will be only five. The overall length of the approach light system remains the same (usually 2,400'). At the pilot's request the tower will switch from the simpler to the more extensive system, or vice versa.

FAA is preparing to provide airmen with suitable notices concerning runways with alternate modes of approach lighting, in the instrument approach plate booklets and in the FAA Airport/Facility Directory. There will also be an explanation in the Airman's Information Manual (AIM).

RUNAWAY INSURANCE COSTS THREATEN GENERAL AVIATION INDUSTRY

Despite the fact that 1985 was the safest year in general aviation since the 1960's, "runaway" costs of aviation liability insurance and litigation are threatening to dry up the production of general aviation aircraft in the near future. This was the opinion expressed by industry experts at an April symposium on product liability, sponsored by the Aircraft Owners and Pilots Association (AOPA) in Washington, D.C.

John L. Baker, president of AOPA, pointed out that the average award in aviation accident liability suits is now over $1 million. As in other industries there is an increasing tendency for the courts to allow expensive judgments against aircraft operators, manufacturers, and repair stations wherever even a remote possibility exists that an alternate action could have been taken to prevent an accident.

Consequently the price tag of new aircraft includes an average figure of about $70,000 for manufacturer's liability protection—up from about $2,000 15 years ago. Operators' liability insurance is escalating proportionately, at a rate which could make general aviation flying an impracticality for most persons in the next decade.

The sumposium produced a number of suggestions for controlling the explosion of liability costs, including Congressional action to limit operators or manufacturers responsibility; FAA rulemaking to raise flight standards and/or stiffen enforcement policies; and improved crashworthiness design.

Most participants, however, agreed that a stepped-up program of accident prevention was the key factor in heading off an even worse explosion of liability costs. They called for a dedicated effort to reduce pilot error accidents (currently accounting two thirds of all accidents), as the best immediate means of protecting the future of flying in America.

NATURAL FABRICS SAFEST

Dressing for safety in the cockpit means wearing garments made primarily of natural fibers, according to recent research on the flammability of clothing.

Wool and cotton materials were found to self-extinguish more readily than synthetics. Also they are less likely to flare up or transmit heat rapidly, or to shrink or melt onto the skin. Synthetics or plastics worn next to the body increase the chances of severe fire damage considerably.

Another factor women should be aware of is that slacks provide better fire protection than dresses, as a skirt will allow the flames to tunnel up inside causing severe burns.

GASA AUDIT CONCLUDED

An 18-month FAA "audit" of selected segments in the general aviation industry was completed on March 21, with a final report that showed good overall compliance with regulations and a high standard of safety.

The general aviation safety audit ("GASA") was initiated in 1984, following completion of a similar national inspection of the airline industry. As a result of the GASA findings FAA will now inspect annually the following operations:

- Part 135 operator (travel clubs, contract cargo operators, and cooperate executive fleets which operate large aircraft.
- Certificated repair stations.
- Air taxis that provide unscheduled passengers and cargo service between small communities.

Additionally, the agency is calling attention to a number of findings that apply to non-certificated flight schools so that self-corrective action can be taken. These include a lack of propeller and avionics maintenance in the training aircraft. There is also a need to provide effective instruction by reference to practical test standards, maintain appropriate student records and adhere to industry or school/instructor developed syllabi.

FAA is preparing to hire and train approximately 500 more flight standards inspectors to carry out the necessary safety inspections.

• Outdated Notice

I have a "notice" from the General Aviation Accident Prevention Program which tells me to NEVER use automotive fuels in my aircraft. However, the STC numbers SE1931CE (engine) and SA1949CE (airframe) I have for my PA-22 Piper Tripacer (Lycoming C-320 A2B engine) authorize the use of certain automobile gasolines.

I don't see any date on the Accident Prevention Program notice. Could it be that the notice was issued before the automotive gasoline STC's were issued?

Lionel D. Holly
La Habra, California

In a word, yes. The notice was drawn up many years before the appropriate studies on autogas in aircraft took place. It is obsolete.

• Misplaced Blood Decimal

As a physician pilot I find your publication very interesting and valuable. I have a question about the news article on alcohol tests in the March/April issue. Shouldn't you have given the prohibited blood alcohol level as .04 percent instead of 0.4 you stated? Probably just a typographical error.

Dr. Eugene Colangelo
Oklahoma City, OK

Right you are. Thank you for bringing it to our attention.

• Radio, Radar Curves

Just to set the record straight, on the subject of radio and radar paths of transmission for low-flying aircraft, as discussed in your article, "Low Level Cross Country Flying" (March/April 1985), let me give you a physicist's opinion.

According to the general theory of relativity all forms of light propagation—radio and radar included—are affected equally by gravity. Light propagation can be refracted—that is, experience a change of direction—as a result of a change in the density of the medium through which it is passing (as when a cloud is encountered). If the change is sudden, the direction of propagation will change suddenly. If the change is gradual, then the direction of propagation may be a succession of changes which appear to us as a curved course.

Therefore, as radar traverses a cloud, its course could be curved earthward by the differing physical properties of varying humidity and droplet densities. Thus, given the presence of low clouds it is possible to obtain a radar return from an aircraft which is flying too low to provide a line-of-sight return in the vicinity of a city with tall buildings. Of course, there is no reason why a radio transmission could not be similarly "bent," as your article seems to suggest.

Louis Hlousek,
Fort Collins, CO

Agreed, in principle. It is conceivable that radar or radio signals might be bent by propagation through clouds in the manner you describe, but very unlikely. We believe that for the incident in the magazine article, radar contact with low flying aircraft was successful, when radio contact was not, because the radar signal emanated from a long distance radar transmitter. This could provide a line-of-sight propagation, which was not available to radio transmitters in the vicinity of the lost aircraft.

• Database Updating

I recently requested and received the avionics database you mentioned in your September/October 1985 issue. I found it very interesting and informative. Are there any plans to update it?

I was also wondering if FAA has a similar database for manufacturers of aircraft, their prices, their sales, etc. If so, how can I obtain a copy?

Matthew A. Boyle
Teterboro, NJ

We expect to update the avionics database to include 1985 and 1986, and will advise readers when it is available. User comments, including requests for additional items to be added to the base, would be welcomed by the program officer, Duane Van Etten, APO-220, 800 Independence Ave., SW, Washington, DC 20591.

In answer to your second question, FAA does not have an aircraft manufacturers' database. However, several of the aviation industry's "alphabet groups" have compiled such information in publications they offer to the public. Contact the General Aviation Manufacturers Association, Suite 801, 1400 K Street, N.W., Washington, D.C., 20005; (202) 393-1500.

• Instrument Currency

Due to having had conflicting input from a variety of sources, I seek your counsel and correct interpretation of FAR §61.57(e)(1) concerning instrument currency.

1. May all six instrument approaches be made in an "approved" simulator?

2. If so, must the simulator be in the same category as the instrument rating? That is, does someone with an "instrument helicopter rating" have to use a helicopter simulator or vice versa?

3. What is the FAR reference for question number 2?

James H. Roelker
Bellevue, WA

FAR §61.57 states that an instrument pilot must have ". . . logged at least six hours of instrument time under actual or simulated IFR conditions, at least three of which were in flight in the category of aircraft involved, including at least six instrument approaches, or passed an instrument competency check in the category of aircraft involved."

All six approaches may be in an approved ground trainer, but all six approaches do not have to be in the same category as the instrument rating. There is no further reference in the FAR's, other than §61.57. The policy interpretation has been formulated by FAA's Airman Certification Branch and the Office of the General Counsel.

FAA GENERAL AVIATION NEWS welcomes comments from our readers. No anonymous letters will be used, but names will be withheld on request. Address: FAA GENERAL AVIATION NEWS, AFS-810, Washington, D.C. 20591.

• 24 Hour Duty Time?

The article titled "New Aircrew Rest Rules" contained in the Nov/Dec 1985 edition of FAA GENERAL AVIATION NEWS stated, that major airlines have new flight time requirements that assure adequate rest periods. While some operations may have been so affected, I cannot agree with the statement in its entirety.

FAR 121 still allows some operations, such as supplemental non-domestic, where crews fly up to twelve hours within a twenty-four hour period. For many crew members, this means (and easily results in) continuous duty periods exceeding twenty hours or more. Preflight and coordination actions, enroute stops, and weather or maintenance delays, in addition to flight time, produce an added amount of fatigue and other adverse effects which should not be ignored. Twelve hours of ground duties plus twelve hours of flight can add up to a continuous duty period of twenty-four hours. Where is the provision for adequate rest under these conditions?

Name withheld

The rule change you refer to addressed flight time limitations and rest requirements only during scheduled domestic air carrier operations. Amendment of the flight time limitations for supplemental or nonscheduled operations may be proposed in future rulemaking.

• "Chance of" Weather

I recently received the following terminal weather forecast: "Ceiling 900 overcast, visibility 2 miles, with a chance of ceiling 300 overcast and visibility 1 mile in thunderstorms."

If there is a chance of the ceiling being below 600 feet or the visibility being less than two miles, does that invalidate the use of this airport as an alternate for an IFR flight plan? If so, does this apply as well to transient weather phenomena such as thunderstorms?

Cyril Toker, M.D.
Potomac, MD

If the official forecast indicates that there is a "chance" or a "slight chance" of the ceiling or visibility being below alternate minimums, or that this may occur "occasionally," you may not legally use the airport as an alternate in your flight plan. Note that weather minimums for instrument approaches at an alternate airport differ from the minimums that apply when using the airport as a primary destination. Standard alternate minimums (FAR Part 91.83) are 600/2 for precision approaches and 800/2 for non-precision. Alternate minimums for published approaches are found in the front section of the instrument approach chart booklets.

The forecast of thunderstorms or related weather phenomena does not affect the selection of an alternate airport.

Incidentally, with regard to precipitation the expression "chance of" may be used when the probability of this phenomenon occurring is 30-50 percent or less. "Slight chance of" means a 10-20 percent probability. "Occasional" means a probability of greater than 50 percent, but the event is not expected to persist for more than half of the forecast duration time.

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(continued from page 13)

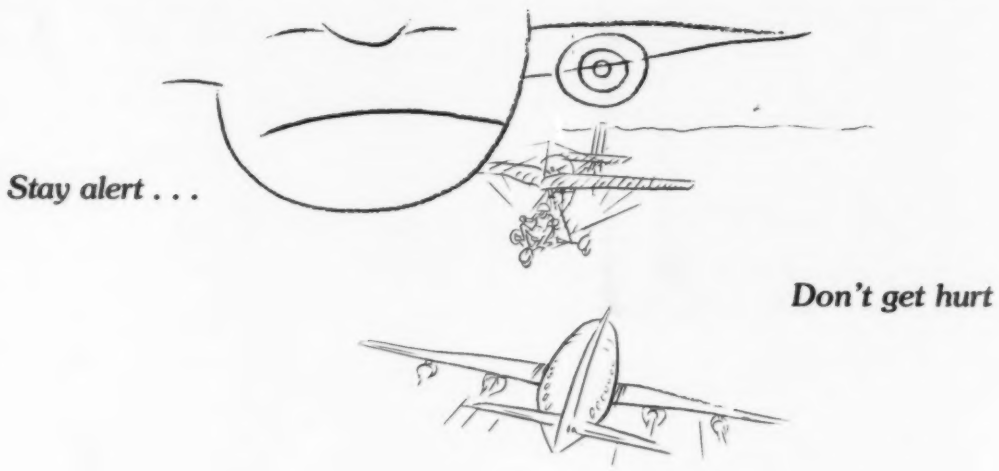
Inflight propulsion by wing flapping was no problem in itself. The biggest problem was to achieve pitch stability and controllability without a movable tail. The solution was an onboard autopilot that would continually adjust the center of lift relative to the center of gravity as the wing moved fore and aft in the manner of tailless birds.

By the end of 1985, the team had built their fifteenth and last model, incorporating all of the carefully tested findings. The size was that of a young pterodactyl of 44 lbs., with an 18 foot wingspan. The computerized autopilot was linked to a pitch-rate gyro and an angle-of-attack vane as sensors. All commands could be overridden by a ground-based operator via radio.

Power for the flapping motion was supplied by two one-horsepower samarium-cobalt DC motors, powered by six pounds of nickel-cadmium batteries. (This is enough for five minutes of fully powered flight; gliding will extend that time.) Three independent motion control systems provided (1) wing twist for achieving lift and controlling roll, (2) wing sweep for controlling pitch, and, of course, (3) flapping as a source of thrust. In varying atmospheric conditions, the computer "brain" would automatically alter the wing's shape and movement. A tail section was provided for stability in takeoff, but would be dropped off soon afterwards and the head would act as the rudder. A simulated cluster of rudimentary fingers (which gives the pterodactyl its name—dactyl means finger) on each wing would act as spoilers and drag breakers.

QN was made as biologically natural as possible with an enormous orange broadsword of a bill and glassy green eyes set in a large blue head. A layer of short stiff hair covered the neck and body. Carbon fibers and foam with latex covering were used to make the wings.

After a vexatious series of mishaps, breakages and repairs, the final moment of truth for *QN* came late on the afternoon of January 7, 1986, over the sands of El Mirage dry lake in southern California. After launch, first the trolley was dropped with the tail boom. Then the huge flying reptile was outlined against the desert sky much as it might have looked some 65 million years ago. The long head swerved from side to side, the broad wings flapped gently and moved back and forth in response to air currents and electronic instructions. The flight lasted only two minutes, but a long journey back in time had begun.

What is the value of an oversized model airplane designed to look like a pterodactyl, with a price tag of about $500,000? In Dr. MacCready's view *QN* is much more than a scientific curiosity or toy. In duplicating the largest known creature able to fly, we have an opportunity to unravel new and perhaps vitally important secrets about a phenomenon which has always fascinated human beings: flight.

QN will have a major role in a new film which will explore the relationship between natural and mechanical flight. The film, "On the Wing," will be shown on the special wide screen of the world's most popular museum, the Smithsonian Air and Space Museum in Washington, DC, beginning on June 20. Subsequently, it will also be shown at cultural centers in Cape Canaveral, Denver, Los Angeles, New York and Seattle, as well as in many foreign countries. ■